S-E-C-R-E-T

ANNEX III

AIR FORCE POSITION ON CAPABILITY OF
CHINESE COMMUNIST RAILROADS

29 January 1954

The Air Force in attempting to determine the capability of the
Chinese Communist railroad system has applied four different methods of
calculation to figures based, in our estimation, on the most recent informa-
tion available to the represented intelligence agencies as presented to
the joint working group of the Transportation Subcommittee of the EIC.
The first two methods (A and B) are based on what the Air Force considers,
in the light of railway operating limitations, to be a reasonable estimate
of peak Chinese Communist operating capability and differ only in that a
slightly different method of calculation was used for each independent
calculation by different capable analysts. The third and fourth methods
(C and D) were used in order that no approach be overlooked. Method "C"
is based on the premise, judged by the Air Force to be highly improbable,
that not only do the Chinese outstrip all the free nations of the world
for which the Air Force has reliable statistics in railroad operations,
but in many aspects surpass and in the remaining aspects approximate the
USSR railroad capability. Method "D" is based on an Air Force interpreta-
tion of the probable meaning of Chinese Communist published figures as
stated in CIA comments on JIC 635/1 and the State Department comments
issued to the T.S.C. working group. It is the opinion of the Air Force
that the internal consistency of this approach, particularly in light
of the fact that all pertinent published figures were interpreted and
used, tends to indicate that this may be a valid method of using Chinese
Communist railroad statistics. Furthermore this method, for the most
part, falls into a pattern which more closely approximates railroad
operating performance as it has always been understood by the Air Force.

USAF Declass/Release Instructions On File

S-E-C-R-E-T

S-E-C-R-E-T

A. Elements and Calculations in JIC Method*

1. <u>Car Park</u> - 40,000 operable cars

2. <u>Average Load Per Loaded Car</u> - 23.1 tons per car

3. <u>Train Speed</u> - 20 KM per hour (between division stops)

4. <u>Average Time For Division Stops</u> - 6 hours per stop

5. <u>Loading and Unloading Time (Loaded Haul)</u> - 48 hours (per turnaround including initial and final terminals)

6. <u>Average Loaded Haul</u> - 500 KM

7. <u>Pooling and Running Repair Time</u> - 10% of car time

8. <u>Car-Utilization Factor</u> - 60% (% of loaded to total car time)

9. <u>Calculation of Turnaround</u>

$$\frac{\text{Average Haul}}{\text{Speed}} = \frac{500 \text{ KM}}{20 \text{ KM/hr}} = 25 \text{ hours}$$

$$\frac{\text{Average Haul}}{\text{KM per division}} = 1 \times 6 = 3.13 = 1 \times 6 = 12.8 \text{ hours}$$

Loading, unloading
Initial and final terminal) time (Loaded Haul): <u>48</u> hours

TOTAL 85.8 hours

Plus 10% pooling and running repair: <u>8.6</u>
94.4

Above total divided by 60%
Car-Utilization factor $.60\overline{)94.4}^{157.3}$

Turnaround: 157.3 or 6.55 days

10. <u>Cars Per Day</u>

$$\frac{40,000}{6.55} = 6,107 \text{ cars/day}$$

11. <u>Tons Per Day</u>

$6,107 \times 23.1 = 141,071.7$ tons/day (metric)

12. <u>Tons Per Year</u>

$365 \times 141,071.7 = 51,491,171$ tons (metric)

*For justification of items 1, 2, 3 and 6 see part "C"; Items 4, 5, 7 and 8 are taken from JIC 63/1.

- 2 -

S-E-C-R-E-T

B. Elements and Calculations in Theoretical Operation Method*

   1. Car Park - 40,000 operable (plus assumed 4% inoperable)

   2. Average Load Per Car

      a. Car Capacity - 30 metric tons

      b. Average Load per Loaded Car - 77% of capacity or 23.1 tons

      c. Average Length of Loaded Haul - 500 kms

   3. Daily carloadings

$$\frac{41660 = X \times 1.15}{\dfrac{\overline{\dfrac{500 \text{ KM}}{15 \text{ KM/hr}}}}{24} \div 92 \div 12} = 6341 \text{ cars loaded per day}$$

   4. Average turnaround time - 6.3 days

   5. Tons originated per Day

      6341 x 23.1 = 146,477 tons

   Tons originated per Year

      146,477 x 365 = 53,464,105 tons originated per year

*For justification of items 1 and 2 see Part "C".

C. Elements and Calculations in Comparative Method

   1. Car Park

      40,000 operable freight cars (considered by Air Force /in light of JIC and TSC working group investigations/ to be the most reasonable estimate). See Tab A to Annex I.

   2. Average Load Per Loaded Car

      a. Car Capacity

         30 metric tons (considered by Air Force /in light of TSC working group investigation/ to be the most reasonable estimate)

      b. % of Capacity of Average Load per Loaded Car

         77% of average car capacity or 23.1 metric tons

         (UN statistics available to the Air Force indicate that the highest % of capacity realized per loaded car occurred in Turkey where 70.1% was achieved in 1950. Austrian figures (West Zone) on average load per loaded car handled in that country (approximately 80%) can not be compared to the average capacity of an Austrian owned car, since 28% of loaded cars in Austria are foreign rolling stock which, particularly in the case of the heavy German and Italian transfer traffic and traffic between these countries and Austria, may be carried in much larger cars. /Italian 2 axle cars average 75 to 119% greater capacity than the average for the entire Austrian park./

- 3 -

S-E-C-R-E-T

Sources: Annual Bulletin of Transport Statistics 1950 -
Economic Commission For Europe - Transport Division - United
Nations. (Average car load in tons) - Appropriate NIS and

25X1C

(Soviet claimed car loadings and tons originated are in general
so computed that it is difficult to determine the average load
per physical unit. Their car capacity figures are also so
computed as to make it difficult to determine the actual capac-
ity per physical unit. If the most optimistic view is taken
on all points /from the Soviet viewpoint/ the Soviet average
car load would equal approximately 84% of the average car
capacity in 1950). Source: Hunter Soviet Transportation
Policy (Draft). Taking a mean between the highest available
reliable United Nations estimate and the most optimistic view
of the Soviet claims, the Air Force believes, gives a reason-
able estimate of a maximum % of load of car capacity for
Communist China. See 3b.

3. **Turnaround Time** 5.57 days

   a. **Average Length of Haul**

   500 kms.

   (Average length of haul for basic commodities as given in ORR
   Draft Study on China RR Capability, dated 16 November 1953
   /CIA #446212/ is 485 kms. The Air Force believes that the
   non-basic commodities would have a longer average haul. We
   also believe that in the light of the heavy traffic to and
   from the USSR /which if brought as far as Changchun would
   involve an average haul of 884 kms/ that this (500 km) is a minimum
   estimate. Furthermore we believe that this figure for present
   day China as a whole compares favorably with the 332 km figure
   for Manchuria alone under the Japanese.)

   b. **Average Length of Trip**

   714 kms.

   (This is based on an ability on the part of the Chinese to
   find loads immediately for return trips not only at a fre-
   quency that is higher than all the nations of the non-Communist
   world on which the Air Force has statistics, but of material
   that lends itself to loadings which maintain an over-all %
   of car capacity level of 77%. In the USSR after 30 years of
   effort the Soviets have maintained an average of loaded haul
   to total freight car trip of 71.2% while reaching a claimed
   average of loads to capacity of 84% /1950/. The above fig-
   ure assumes an ability on the part of the Chinese to maintain
   an average of 70% of trip in loaded movement and an average
   of loads to capacity of 77%.)

   c. **Travel Time**

      1. **Average Speed Between Division Points** - 20 kms p.h.

      (The Air Force believes this estimate to be a maximum
      one in the light of recent JIC and TSC working group
      investigations and Soviet Russian experience in 1950
      /20 km/p.h./).

      2. **Average Time in Motion (Including Way Stations) Per
      Turnaround** - 35.7 hrs.

      (714 km ÷ 20 km per hr. = 35.7 hrs.)

- 4 -

S-E-C-R-E-T

3. <u>Average Stopping Time Per Turnaround</u> - 50.1 hours

   (exclusive of loading and unloading time)
   (This figure is believed to be a minimum figure since
   it is the amount of time used by the Soviets in a haul
   of this length)

4. <u>Loading and Unloading Time Per Turnaround</u> - 48 hours

   (including switching to and from loading and unloading
   points outside large initial and final terminal yards)

   (This time is considered to be a minimum time for the
   Chinese Communists, by the Air Force, since it is almost
   two hours less than the average time taken by the Soviets
   in 1950 for the same operation)

4. <u>Tons Originated Capability</u>

   165,881 metric tons daily; 60,546,565 metric tons per annum.

   (40,000 cars ÷ 5.57 days = 7,181 cars loaded daily
   7,181 x 23.1 (tons per car) = 165,881 tons daily x 365 = 60,546,565
   per annum)

D. Elements and Calculations in Method Based on Chinese Communist Figures

   1/   131,000,000   Net Tons Handled
   2/   59,500,000,000   Gross Ton Kilometers (loaded and empty)
   3/   28.7   Net Tons per car
   4/   17.3   Tare wt. per car (Gross ton kms - net ton kms =
                                             tare ton kms ÷ car kms =
                                             tare wt. per car.)

   5/   2.9   Days transit time
   6/   237.3   Km per day av. distance per car handled
   7/   12,504   Loaded cars per day hauled
   8/   66%   Loads
   9/   34%   Empties
   10/   18,945   Cars per day hauled loads and empties $\left(\frac{12,504}{.66}\right)$

   a. Loaded cars per day handled

   $$\frac{131,000,000 \quad 1/}{365 \times 28.7 \quad 3/} = 12,504 \quad 7/$$

   (1) $\frac{12,504}{2.9}$ = 4,312 car loads per day originated

   b. Av. gross ton per car handled

   $$\frac{\left/(17.3 \div 28.7) \; \frac{8/}{66} + (17.3 \times 34) \right.}{100 \quad 8/ \text{ and } 9/} = 36.24$$

- 5 -

S-E-C-R-E-T

c. Gross ton kms per annum

(1) $\underset{10/}{18,945} \times \underset{b.}{36.2} \times \underset{6/}{237.2} \times 365 = 59,466,400,084$

(2) $(\underset{7/}{12,504} \times \underset{3/}{28.7} \times \underset{6/}{237.3} \times 365) + (\underset{10/}{18,945} \times \underset{4/}{17.3} \times \underset{6/}{237.3} \times 365)$

(Net ton Kms per annum) 31,082,895,205 (Tare ton Kms per annum)
18,387,772,435 = 59,470,657,630

d. Tons originated

or $\left(\dfrac{131,000,000}{(365 \times 2.9)} = 123760 \right)$

$\dfrac{12504}{2.9} \times 28.7 = 123,746$ net tons orig/day
45,167,290 net tons orig. per annum (metric)

e. Length Haul

1. Individual Railway

$\dfrac{31,082,895,205}{131,000,000} = 237.3$ kms.

2. System

$\dfrac{31,082,895,205}{\frac{131,000,000}{2.9}} = 688.17$ kms.

S-E-C-R-E-T